Cheat Sheet for the EXAFS program

"Gotchas":
Offsets are not saved when LabVIEW exits.

If you use any other program to move the mono while EXAFS is running,
it will get confused and think the mono hasn't arrived. Fix this
by pushing the 'Mono really got there!' button.

Energy Syntax: You can specify energy anywhere in the program in any of the following ways:

8976.73	8976.73eV
cuk	Cu K-edge energy
cukf	Cu Kab fluorescence energy
cuk+200	200eV above Cu K edge
cuk+200/3	(Cu K-edge energy+200)/3
present	Where it is now
start	Start of scan
mid	Middle of scan
end	End of scan

Main page controls:

Start/Abort	Starts or aborts a scan
Print panel	Prints an image of the screen
Stop	Stop program
File of config files	The file which points to the config files for the mono, scaler map, XIA detector, etc.

Main page indicators:

Current energy	Where the mono actually is
There yet?	Did the mono finish its last move?
Limits OK?,	
Motion error?	Mono status indicators
File path for current scan	File on which data will be written
Scan number	A sequence # which becomes part of the filename
Scan state	What the program is doing

Mono (Operation page):

Move mono	Sends mono to a given energy
Mono reset	Tells mono it's actually at given energy
Go to white beam	Tilts crystals to 0deg to get white beam thru
Mono really got there	See "Gotcha" above. Use to clear a condition in which the mono never seems to arrive where commanded.

Scan (Operation page):

Edit scan Opens sub-panel which lets you edit the scan region energies, energy steps, count times, filenames, etc.

Save/Load scan Write scan params to a file or read them back

Measurement (Operation page):

Measure offsets Measure the offsets - make sure all scalers are defined first

Measurement Statistical analysis of counts in channel being plotted

Recordkeeping (Operation page):

Print run info Sends info about present set of scans to the printer

Save run info to HTML Writes an HTML file with this info

Plots (plots page):

Spectrum What you're here for

I0 variation This lets you see small dips and wiggles in I0. Program tries to guess what's meant by I0 from plot specification (v.i.). For instance, if the plot specification says to plot ln(scaler 1/scaler 2), it assumes you're doing transmission and takes scaler 1 as I0. Next, it takes the ln(I0) and subtracts a cubic from it.

Plot controls (plots page):

Plot specification Tells the system what to plot. You can plot any scaler, any sum of scalers, any sum of scalers divided by any other sum, or the ln() of the above. This is explained in the manual for the EXAFS data editor.
The "LED"s are bright for those included in the numerator or denominator sums:

```
 O..  (O = On, . = off)
 .                    Plot Scaler 0
  ...

  O..
 O                    Plot ln(Scaler 0/(Scaler1+Scaler2))
  .OO
```

The following controls affect the spectrum plot:

Autoscale Autoscales the Y-axis. If you turn this off, you can

zoom in manually.

Full range X	Makes the abscissa cover the whole scan range.
Cursor	Puts up a cursor
Differentiate	Differentiates ordinate. Good for edge calibration.
Extremum	Picks up the next min or max past the cursor.

The following controls affect the I0 variation plot:

Autoscale I0	Autoscales Y axis of I0 plot
Lock X to spectrum	Ties abscissa scale to that of spectrum plot
I0 cursor	Puts up a cursor

Scan Editor controls:
Scalers page:
Number of scalers Lets you restrict how many scalers are recorded

Define regions page controls: Lets you set up scan regions
regions
Start energies The boundaries of each region; last = end energy
Energy step How many eV/point
Count time Time/point
Settling time Time to wait after mono 'got there' before
counting

Files page controls: Specify where to write data
Base directory Directory in which to write
Base filename The filename for each scan is of the form
Extension <basename><scan number>.<extension>
Scan number Scan # increments each scan.
Title Comment written into header of file

Dump controls: Specifies beam dump detection
Channel # Which scaler is monitored
Min. allowed rate Call beamdump if rate < this number
0 means don't detect dump

Set control:
Number in set Number of scans to do unless interrupted

Plot:

Plot specification Each scan will start out being plotted
according to this.

---------- A sample scaler map, with comments ----------
Don't change the [Gate] lines

[Gate] Defines the gate-pulse generator
board=1 Which NI6602 board
counter=0 Which channel is used for gate
[Scaler 0] The first scaler - numbering is 0-base
type=660x A channel of the 6602 counter
board=1 Same board as the gate
counter=1 This counter is used as a counter
[Scaler 1]
type=XIA Ge detector (XIA = vendor of electronics)
detector=0 The first element.
roilow=400 Low end of region-of-interest
roihigh=600 High end of region-of-interest
[Scaler 2]
type=XIA
detector=-1 Add up all 7 elements
roilow=500
roihigh=600
[Scaler 3]
type=Analog An A/D channel
counter=3 The 4th channel
[Scaler 4]
type=end That's all - there's no scaler 4.

---------- A sample file-of-config-files, with comments (after ;) ----------
[scan] ; Scan definition - written by scan editor
definition file="/C/MAM/EXAFS code/scan params.cfg"
[XIA scalers] ; Sets up detector
definition file="/C/MAM/EXAFS code/xia config.cfg"
[scaler mapping] ; See above example - this is the only one you should edit
scaler map file="/C/MAM/EXAFS code/660x+XIA scaler map.cfg"
[mono] ; Mono - don't touch this.
mono config file="/C/MAM/EXAFS code/mono.cfg"

---------- A sample XIA config file ----------
Note: the only thing you should ever touch is the Detector Config entry.
This points to one of a set of pre-made files. Each file is for a
specific peaking time and detector configuration. The Detector Config
file in turn points to other files. The MCA utility is used to manage
these.

[XIA TCP/IP]
IP address=localhost
Port #=10000
Path to Start TCP-IP VI="/C/MAM/EXAFS code/XIA/Start TCP-IP for XIA.vi"
[Detector Config]
Config file path="/C/MAM/EXAFS code/XIA/Detector support/Configs/iglet_point5us.scg"

Normalization=FALSE

Get beam in hutch:
Push black seach button on upstream wall.

Close door and hold it closed while you extract the key.

Put key in Kirk lock on outside of hutch.

Shutter switch will work after annoying beeps end.

To see if you really have beam:
Look in viewport just under "BR1032-06" label on rack. A purple glow means beam.

To steer beam onto slits:
Just downstream of the roll slits is a tee with a linear-motion feedthrough sticking out of it. This holds a PIN diode. Position this feedthrough to the mark in the middle. If beam is on, you should get an indication on one of the DVMs. If you don't:
Check that the output of the current amp (Stanford Research Systems) is connected to a DVM.

Try power-cycling the SRS current amp.

Try cranking up its sensitivity.

Make sure roll slits are wide open (400x100um - check using "BL 10.3.2 Main VI". If not, open them using "Single Motor Monitor"

Start "Single Motor Monitor" if not already started.

Choose "Vertical Slit Size" and move to 25um. If this is a decrease in size, you will have to hit the Move button twice because it will limit at a large negative number on moving down.

Choose "Horizontal Slit Size" and move to 100um. This axis does the downward motion correctly.

Choose "M1 Roll" and set the Jog Size to 0.02. Jog up and down to maximize signal. This swings the beam vertically.

Choose "M1 Tilt" and set the Jog Size to 0.001. Jog up and down to maximize signal. This swings the beam horizontally.

Iterate on M1 Roll and M1 Tilt until signal is maximized. You should end up with a signal which registers on the 1mA scale on the current amp.

To start "Single Motor Monitor":
This lives on the PXI computer. If "BL 10.3.2 Main VI" is running and "Single Motor Monitor" isn't, hit the EXIT VI button on the Main VI, then restart it by clicking the little run arrow on the upper left.

If neither VI is running, use the desktop shortcut to start the Main VI, which will automatically launch the Single Motor Monitor.

To move monochromator without the EXAFS or XY programs:
Use "Single Motor Monitor", choosing "Monochromator" or "Mono eV". If you do a reset, this will be reflected in the EXAFS program.

If the EXAFS program is running, you will need to push the "Mono got there" button to tell it that it hasn't really gotten lost.

To set gains on Keithleys:
Use "Keithley 428v2" VI on PXI computer. When you turn the knob, you have to hit the Set button to make it actually happen.

To set up scalers and Ge detector ROIs for EXAFS scanning:
Use the MCA Utility on the UXASES computer (see manual for how-to). This lets you get a PHA spectrum and configure the counting logic in the EXAFS program.